CLAIMS

What is Claimed is:

1. An AC ground fault detector system for sensing an AC signal indicative of an unintended electrical path between a load driven by a power source and a reference potential, said system comprising:

a first power conductor coupled to a first terminal of said power source;

a second power conductor coupled to a second terminal of said power source;

a switching mechanism coupled to the first and second power conductors and operative for alternately connecting a phase of said load with the first and second power conductors according to a predetermined switching rate, whereby, during normal operation, voltages developed at the first power conductor and second power conductor are substantially constant with respect to a reference; and whereby, in the event of an occurrence of said unintended electrical path of at least one phase of the load with the reference potential, time varying voltages are developed at the first power conductor and second power conductor associated with the switching rate;

a detector comprising an input port coupled to the first power conductor for receiving the voltage or current signal on the first power conductor; a processing circuit for processing the received signal and comparing with a threshold value; and an output port for generating an output signal based on said comparison; whereby the occurrence of the unintended electrical path between the load and reference potential causes a change in the voltage or current signal on the first power conductor of sufficient magnitude relative to the threshold value for detection by said detector such that the output signal of the

detector is indicative of a detected fault.

2. The system of claim 1, further comprising a controller responsive to the output signal for interrupting power between the load and the first and second power conductors when the output signal is indicative of a detected fault.

3. The system of claim 2, wherein the power interruption occurs via switch openings within the switching mechanism.

4. The system of claim 1, wherein the processing circuit comprises

a filter responsive to the received voltage or current signal on the first power conductor signal for providing a filtered signal component relative to the reference potential; and

a comparator responsive to the filtered signal component for comparing with said threshold value for providing said output signal.

5. The system of claim 4, wherein said filter comprises a capacitor coupled to a resistor network.

6. The system of claim 1, further comprising a high impedance network having a first terminal coupled to the first power conductor, a second terminal coupled to the second power conductor, and a third terminal coupled to reference potential for equally balancing the voltages developed at the first and second power conductors with respect to the reference potential.

7. The system of claim 1, further comprising an impedance network having a first input port coupled to one of the first and second power conductors and a second input port coupled to the reference potential, the other of the first and second power conductors coupled

directly to the reference potential, the impedance network having coupled between the first and second input ports at least one of a resistive or inductive load.

8. The system of claim 1, further comprising a first capacitor having a first terminal coupled to one of the first and second power conductors, and a second terminal coupled to the reference potential.

9. The system of claim 1, wherein said load comprises a multi-phase motor.

10. The system of claim 9, wherein said switching mechanism includes pairs of switches, each said pair of switches having a common terminal coupled to a respective phase of said multi-phase motor, and wherein for each of said pairs of switches, a first switch of said pair is operative for selectively coupling the first power conductor to the respective phase of said multi-phase motor, and a second switch of said pair of switches is operative for selectively coupling the second power conductor to the respective phase of said multi-phase motor.

11. The system of claim 1, wherein said detector is a current sensor having a first port coupled to the first power conductor and a second port coupled to the reference potential via a capacitor.

12. The system of claim 1, wherein the processing circuit comprises

a capacitor having a first terminal coupled to the first power conductor and a second terminal coupled to a transformer for providing an attenuated signal component relative to the reference potential; and

a comparator responsive to the attenuated signal component for comparing with said threshold value for providing said output signal.

13. A power system for driving a load, said power system comprising:

a power distribution unit for distributing power via first and second power conductors to a corresponding at least one lead of said load according to a switching mechanism which selectively couples a given lead of said load to one of said first and second power conductors at a predetermined switching rate, said first and second power conductors capacitively coupled to one another;

a capacitor having a first terminal coupled to one of the first power conductor and second power conductor, and a second terminal coupled to the reference potential; and

a detector circuit coupled to the first power conductor, said detector circuit operative for sensing a change in voltage across said first power conductor with respect to the reference potential indicative of an unintended electrical path between at least one said lead and said reference potential, causing said voltage developed across said first power conductor to vary according to the magnitude of the power source, said detector generating a fault signal in response said sensed voltage change exceeding a predetermined threshold; and

a controller responsive to the fault signal for interrupting power from the first and second power conductors to the load, thereby tending to eliminate the time varying voltage developed at one of the first and second power conductors in response to the unintended electrical path between said least one lead and said reference potential, from being discharged across said capacitor.

14. The system of claim 13, further comprising a high impedance network coupled between the first and second power conductors for equally balancing the power distributed from the power distribution unit between a maximum positive voltage and minimum negative voltage with respect to the reference potential.

15. The system of claim 13, wherein the detector comprises an RC filter coupled to the first power conductor for providing an attenuated signal component relative to the reference potential; and a comparator responsive to the attenuated signal component for comparing with a threshold voltage for providing said control signal.

16. The system of claim 13, wherein the detector comprises a capacitor having a first terminal coupled to the first power conductor and a second terminal coupled to a transformer for providing an attenuated signal component relative to the reference potential; and a comparator responsive to the attenuated signal component for comparing with said predetermined threshold.

17. A method for detecting an unintended electrical path between a phase lead of a motor and reference potential during power servicing of the motor by a power unit, the motor being selectively coupled to one of first and second power conductors according to a switching mechanism at a predetermined switching rate, and wherein an at least one capacitor is coupled between one of the first power conductor and second power conductor, and the reference potential, the method including steps of:

sensing a voltage signal on the first power conductor relative to the reference potential;

filtering the sensed voltage signal to obtain a filtered signal component;

comparing the filtered signal component with a threshold value; and

interrupting the servicing of power to the motor when the filtered signal component exceeds the threshold value.

18. The method of claim 17, wherein the step of interrupting comprises opening switches within the switching mechanism that selectively couples the motor to the first and second

power conductors.

19. The method of claim 17, wherein the step of sensing the voltage signal on the first power conductor comprises capacitively sensing a square wave voltage signal developed at the first power conductor and having a peak value corresponding to the magnitude of the voltage of the power source.

20. The method of claim 17, further comprising the step of providing a high impedance network between the first and second power conductors for equally balancing the voltages developed at the first and second power conductors with respect to the reference potential.